



DRAFT ENERGY STAR Qualified Homes, Version 3 Program Requirements for the State of Hawaii

This Reference Design may only be used in the State of Hawaii

Qualifying Homes

The following homes are eligible to earn the ENERGY STAR:

- Single-family homes;
- Units in multi-family buildings that are three stories or less;
- Units in multi-family buildings that are four or five stories and have their own heating, cooling, and hot water systems, separate from other units

Homes may earn the ENERGY STAR using the following ENERGY STAR Prescriptive Path or Performance Path in the state of Hawaii. Note that compliance with these guidelines is not intended to imply compliance with all local code requirements that may be applicable to the home to be built.¹

ENERGY STAR Prescriptive Path for Hawaii

The prescriptive path provides a single set of measures that can be used to construct an ENERGY STAR qualified home. Modeling is not required; however, no tradeoffs are allowed. Follow these steps to use the prescriptive path:

1. First, assess eligibility to follow the prescriptive path by comparing the conditioned floor area (CFA) of the home to be built, as calculated using RESNET Standards, to the CFA of the Benchmark Home as specified in Exhibit 4. The CFA of the Benchmark Home shall be determined based on the number of bedrooms in the home to be built.² If the CFA of the home to be built exceeds this value, then the performance path shall be used.
2. If the home to be built is eligible to follow the prescriptive path, build the home using the ENERGY STAR Reference Design, Exhibit 1, and Mandatory Requirements for All Qualified Homes, Exhibit 2. Note that EPA will provide modified Mandatory Requirements and ENERGY STAR Reference Design specifications as energy codes become more rigorous. Once published, conformance to these modified guidelines will be required after a specified transition period, typically 60 days, to earn the ENERGY STAR in Hawaii.
3. Using a Rater, verify that all requirements have been met in accordance with the Mandatory Requirements for All Qualified Homes and with RESNET's On-Site Inspection Procedures for Minimum Rated Features.³

ENERGY STAR Performance Path for Hawaii

The performance path provides flexibility to select a custom combination of measures for each home that is equivalent in performance to the minimum requirements of the ENERGY STAR Reference Design, in Exhibit 1. Equivalent performance is assessed through energy modeling. Follow the steps below to use the performance path:

1. Determine the ENERGY STAR HERS Index Target, which is the highest numerical HERS index value that each rated home may achieve to earn the ENERGY STAR. This target shall be specifically determined for each rated home by following the steps outlined in the document titled, "ENERGY STAR HERS Index Target Procedure for Hawaii, Version 3", available on EPA's Web site. This procedure defines how to configure the ENERGY STAR Reference Design Home for Hawaii and calculate its associated HERS index value and then how to apply the appropriate Size Adjustment Factor to determine the ENERGY STAR HERS Index Target.

Note that EPA will provide modified Mandatory Requirements and ENERGY STAR Reference Design specifications as energy codes become more rigorous. Once published, conformance to these modified guidelines will be required after a specified transition period, typically 60 days, to earn the ENERGY STAR in Hawaii.

2. Using the same RESNET-accredited Home Energy Rating software program, configure the preferred set of energy measures for the rated home and verify that the resulting HERS Index meets or exceeds the ENERGY STAR HERS Index Target, as determined in Step 1. Note that, regardless of the measures selected, Mandatory Requirements for All Qualified Homes, Exhibit 2, are also required.

Furthermore, on-site power generation may only be used to meet the ENERGY STAR HERS Index Target for homes that are larger than the Benchmark Home and only for the incremental change in ENERGY STAR HERS Index Target caused by the Size Adjustment Factor, as outlined in the ENERGY STAR HERS Index Target Procedure for Hawaii, Version 3.

3. Construct the home using the measures selected in Step 1, and the Mandatory Requirements for All Qualified Homes, Exhibit 2.
4. Using a Rater, verify that all requirements have been met in accordance with the Mandatory Requirements for All Qualified Homes and with RESNET's On-Site Inspection Procedures for Minimum Rated Features.³

Checklist Instructions

The Rater must review all items in this ENERGY STAR Reference Design checklist. The column titled "N/A," which denotes items that are "not applicable," should be used when the checklist item is not present in the home or conflicts with local requirements. In the event that a Rater finds an item that is inconsistent with this regional reference design, the home cannot earn the ENERGY STAR until the item is corrected. If correction of the item is not possible, the home cannot earn the ENERGY STAR. In the event that an item cannot be inspected by the Rater, the home also cannot earn the ENERGY STAR.



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Exhibit 1: ENERGY STAR Reference Design

Home Address: _____		City: _____	State: _____		
Inspection Guidelines		Rater Verified	Must Correct	N/A	
Benchmark Home Size	Home Size (ft ²) ≤ Benchmark Home Size (ft ²) # BR: ____ Home Size (ft ²): _____ Benchmark Home Size (ft ²): _____	<input type="checkbox"/>	-	-	
Cooling Equipment	Cooling equipment, where provided, meets one of the options below (check one): <input type="checkbox"/> ≥ 14.5 SEER / 12 EER ENERGY STAR qualified AC <input type="checkbox"/> Heat pump (See Heating Equipment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Heating Equipment	Heating equipment meets one of the options below (check one): <input type="checkbox"/> ≥ 80 AFUE gas furnace <input type="checkbox"/> ≥ 80 AFUE oil furnace <input type="checkbox"/> ≥ 80 AFUE boiler <input type="checkbox"/> ≥ 8.2 HSPF / 14.5 SEER / 12 EER ENERGY STAR qualified air-source heat pump with electric backup or ENERGY STAR qualified dual-fuel backup <input type="checkbox"/> Ground source heat pump, any product type, ENERGY STAR qualified ⁴	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Envelope	If ductwork in attic, radiant barrier or ENERGY STAR qualified roof product. ⁵	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Insulation achieves Grade I installation per RESNET standards ⁶	<input type="checkbox"/>	<input type="checkbox"/>	-	
	Ceiling insulation ≥ 30 R-Value ⁶	<input type="checkbox"/>	<input type="checkbox"/>	-	
	Wall insulation ≥ 13 R-Value ⁶	<input type="checkbox"/>	<input type="checkbox"/>	-	
	Floor insulation over unconditioned space ≥ 13 R-Value ⁶	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Water Heater	HECO Solar Water Heating System Accepted Product installed ⁷	<input type="checkbox"/>	<input type="checkbox"/>	-	
Ductwork	Programmable thermostat installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Supply ducts in unconditioned attic ≥ R-8; All others in unconditioned space ≥ R-6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Total duct leakage ≤ 6 CFM25 per 100 sq. ft. of CFA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Duct leakage to outdoors ≤ 4 CFM25 per 100 sq. ft. of CFA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lighting & Appliances	ENERGY STAR qualified refrigerators, dishwashers, ceiling fans, exhaust fans. ⁸	<input type="checkbox"/>	<input type="checkbox"/>	-	
	ENERGY STAR qualified CFLs or pin-based lighting in 80% of fixtures. ⁹	<input type="checkbox"/>	<input type="checkbox"/>	-	

Mandatory Requirements for All ENERGY STAR Qualified Homes in Hawaii

All ENERGY STAR Qualified New Homes must meet the requirements of the checklists in Exhibit 2. The Water Management System Builder checklist is not required for homes that also qualify for Indoor airPLUS.¹⁰

Exhibit 2: Mandatory Requirements for All Qualified Homes

Area of Improvement	Mandatory Requirements
1. Heating, Ventilation, & Air Conditioning (HVAC) System	<ul style="list-style-type: none"> Completed HVAC System Quality Installation Contractor Checklist Completed HVAC System Quality Installation Rater Checklist
2. Water Management System	<ul style="list-style-type: none"> Completed Water Management System Builder Checklist (or Indoor airPLUS Verification Checklist)¹⁰
3. Thermal Comfort	<ul style="list-style-type: none"> Completed Thermal Comfort System Rater Checklist for Hawaii



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Exhibit 3: Thermal Comfort System Rater Checklist for Hawaii

Inspection Guidelines	Rater Verified	Must Correct	N/A
1.1 Sensible and latent cooling load reduced through any combination of energy efficient design practices such that required cooling capacity is ≤ 1 ton per 1,000 ft ² of CFA. ¹¹	<input type="checkbox"/>	<input type="checkbox"/>	-
1.2 Operable aperture areas totaling a minimum of 12 percent of the floor area of the room shall be provided for all primary living areas and main bedrooms ¹²	<input type="checkbox"/>	<input type="checkbox"/>	-
1.2.1 Insect screens shall be provided for all windows and doors to be considered operable aperture area. All screened entry doors and interior doors in the ventilated areas shall be provided with either (1) mechanically attached door stops (or similar devices) to hold the door in an open position or (2) operable louvers. AND ;	<input type="checkbox"/>	<input type="checkbox"/>	-
1.2.2 The total aperture area shall be provided by a minimum of two distinct windows. Each window shall provide not more than 70 percent of the total aperture area. The windows shall be placed in adjacent or opposite walls. If placed on adjacent walls, windows shall be placed a minimum of one third of the wall width from the adjoining corner. The windows may be placed on a single outside wall if wing walls are used. ¹³	<input type="checkbox"/>	<input type="checkbox"/>	-
1.5 Solar gain through windows reduced using one of the following options: ¹⁴			
1.5.1 South-facing windows have 45° overhang and all other windows have 70° overhang, OR ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5.2 Windows: ≤ 0.60 U-Value; ≤ 0.27 SHGC, AND ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5.3 Skylights: ≤ 0.70 U-Value; ≤ 0.30 SHGC, AND ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5.4 If total window-to-floor area $>15\%$, then SHGCs adjusted as outlined in footnote 15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 One ceiling fan installed:			
1.6.1 In every bedroom, AND ;	<input type="checkbox"/>	<input type="checkbox"/>	-
1.6.2 For every 400 ft ² of conditioned floor area, excluding bedrooms	<input type="checkbox"/>	<input type="checkbox"/>	-

Exhibit 4: Benchmark Home ²

Bedrooms in Home to be Built	1	2	3	4	5	6	7	8
Conditioned Floor Area <small>Benchmark Home</small>	1,000	1,600	2,200	2,800	3,400	4,000	4,600	5,200

Notes:

- Where requirements of the local codes, manufacturers' installation instructions, engineering documents, or regional ENERGY STAR programs overlap with the requirements of these guidelines, EPA offers the following guidance:
 - In cases where the overlapping requirements exceed the ENERGY STAR guidelines, these overlapping requirements shall be met;
 - In cases where overlapping requirements conflict with a requirement of these ENERGY STAR guidelines (e.g., slab insulation is prohibited to allow visual access for termite inspections), then the conflicting requirement within these guidelines shall not be met. Furthermore, qualification shall still be allowed if the rater has determined that no equivalent option is available that could meet the intent of the conflicting requirement of these ENERGY STAR guidelines (e.g., switching from exterior to interior slab edge insulation).
- The average-size home with a specific number of bedrooms is termed the "Benchmark Home". The conditioned floor area of a Benchmark Home (CFA Benchmark Home) is determined by selecting the appropriate value from Exhibit 4. For homes with more than 8 bedrooms, the CFA Benchmark Home shall be determined by multiplying 600 sq. ft. times the total number of bedrooms and adding 400 sq. ft.



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Example: CFA Benchmark Home for a 10 bedroom home = (600 sq. ft. x 10) + 400 sq. ft. = 6,400 sq. ft.

A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

An egress window, as defined in IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

- have a sill height of not more than 44 inches above the floor; AND
 - have a minimum net clear opening of 5.7 sq. ft.; AND
 - have a minimum net clear opening height of 24 in.; AND
 - have a minimum net clear opening width of 20 in.; AND
 - be operational from the inside of the room without the use of keys, tools or special knowledge
3. The term "Rater" refers to the person completing the third-party inspections required for qualification. This party may be a certified Home Energy Rater, BOP Inspector, or an equivalent designation as determined by a Verification Oversight Organization such as RESNET.
 4. The following efficiency levels shall be used based on ground-source heat pump product type:
 - Closed Loop Water-to-Air: ≥ 3.5 COP / 16.1 EER
 - Open Loop Water-to-Air: ≥ 3.8 COP / 18.2 EER
 - Direct Geo-Exchange (DGX): ≥ 3.6 COP / 16 EER
 - Closed Loop Water-to-Water: ≥ 3.0 COP / 15.1 EER
 - Open Loop Water-to-Water: ≥ 3.4 COP / 19.1 EER
 5. Required only if more than 10 linear feet of ductwork are located in an unconditioned attic. Any radiant barrier with a minimum initial reflectance of 0.90 and maximum initial emittance of 0.10 meets the requirement for a radiant barrier.
 6. Insulation shall be verified by a Rater to achieve Grade I installation as defined in the RESNET Standards, except for wall framing systems with rigid insulation sheathing. For such homes, Grade II installation is acceptable for the cavity insulation only if the rigid insulation sheathing meets or exceeds R-3.
 7. The water heater variances described in HRS 196-6.5 "Solar Water Heating System Standards" are allowed under the ENERGY STAR for New Homes program in Hawaii. However, if variances one, two or four are used, an ENERGY STAR qualified Gas Condensing, Whole Home Gas Tankless, or Electric Heatpump water heater shall be installed. The third variance, which allows for a renewable energy technology system to be used as the primary energy source for heating water, may also be used to meet this requirement.
 8. All exhaust fans shall be ENERGY STAR qualified, except in half bathrooms. A half bathroom is any bathroom that does not contain a bathtub, shower, spa, or similar source of moisture.
 9. The ENERGY STAR Advanced Lighting Package (ALP), which requires a minimum of 60% ENERGY STAR qualified hard-wired fixtures and 100% ENERGY STAR qualified ceiling fans, where installed, may also be used to comply with the lighting requirements.
 10. A completed and signed Indoor airPLUS Verification Checklist may be submitted in lieu of the Water Management System checklists. Indoor airPLUS is a complimentary EPA label recognizing new homes equipped with a comprehensive set of Indoor Air Quality (IAQ) features. Indoor airPLUS verification can be completed by a Rater during the ENERGY STAR verification process. For more information, see www.epa.gov/indoorairplus
 11. Cooling loads shall be calculated according to the latest editions of ACCA Manual J, ASHRAE 2009 Handbook of Fundamentals, or a substantively equivalent procedure.
 12. Operable windows, skylights, window air inlets or similar devices shall be directly accessible to the occupant (e.g. can be opened without the use of ladders or special tools). Where openings are covered with louvers or otherwise obstructed, operable area shall be based on the free unobstructed area through the opening.
 13. Where wing walls are included in the building design for ventilation purposes, they shall be placed between windows to create a high-pressure and a low-pressure zone on each window. Wing walls shall extend from the ground to eave height, be located on the windward side of the building, and extend outward from the building a distance at least equal to one-half the width of the window.
 14. Angles measured from the horizontal sill plane to the edge of the roof eave.
 15. All decorative glass and skylight window areas count toward the total window area to above-grade conditioned floor area (WFA) ratio. For homes using the prescriptive path that have a WFA ratio >15%, the following improved window SHGC:

$$\text{Improved SHGC} = [0.15 / \text{WFA}] \times [\text{ENERGY STAR SHGC}]$$

Where the ENERGY STAR SHGC is the maximum allowable SHGC in Exhibit 1, ENERGY STAR Reference Design.

